

NAVSEA  
STANDARD ITEM

FY-00

ITEM NO: 009-12  
DATE: 06 NOV 1998  
CATEGORY: II

1. SCOPE:

1.1 Title: Welding, Fabrication, and Inspection Requirements;  
accomplish

2. REFERENCES:

- a. Standard Items
- b. MIL-STD-1689, Fabrication, Welding, and Inspection of Ships Structure
- c. American Bureau of Shipping (ABS) Rules for Building and Classing Steel Vessels
- d. 0900-LP-060-4010, Fabrication, Welding, and Inspection of Metal Boat and Craft Hulls
- e. S9074-AQ-GIB-010/248, Requirements for Welding and Brazing Procedure and Performance Qualification
- f. 0900-LP-001-7000, Fabrication and Inspection of Brazed Piping Systems
- g. S9074-AR-GIB-010/278, Requirements for Fabrication Welding and Inspection, and Casting Inspection and Repair for Machinery, Piping, and Pressure Vessels
- h. MIL-STD-22, Welded Joint Design
- i. MIL-STD-2035, Nondestructive Testing Acceptance Criteria
- j. T9074-AS-GIB-010/271, Requirements for Nondestructive Testing Methods
- k. DOD-STD-2185, Requirements for Repair and Straightening of Bronze Naval Ship Propellers
- l. S9221-C1-GTP-010/020, Repair and Overhaul, Main Propulsion Boilers
- m. MIL-STD-2191, Repair, Welding, Weld Cladding, Straightening, and Cold Rolling of Main Propulsion Shafting

3. REQUIREMENTS:

3.1 Utilize specific requirements of 2.b through 2.1 listed in Tables One, 2, 3, and 4 of this item for determining the welder and brazer qualifications, electrodes, weld design, welding requirements, brazing requirements, welding procedures, brazing procedures, welding parameters and controls, inspection standards, and acceptance criteria.

3.2 Ground welding machines, for purposes of providing a return path for welding current, using a grounding bar or lead which shall be connected directly from the machine ground return connection to the ship's hull, sized on the basis of 1,000,000 Circular Mils per 1,000 amps per 100 feet, but in no event using less than a Number One cable (85,037 Circular Mils).

3.2.1 Welding machines used for welding on machinery, pressure vessels, or piping, rotating ordnance, electronic, or fire control equipment shall have the ground return connection in the immediate vicinity of the work to ensure that current does not flow through bearings, pipe hangers, or other areas where arcing or high resistance paths exist. For ships constructed of non-magnetic materials, the ground return cables shall be connected directly to the component being welded - as close to the weld zone as feasible.

3.3 Accomplish the requirements of 009-09 of 2.a for specific welding, brazing, and inspection operations as follows:

3.3.1 Class A-F, A-1, A-2, A-3, A-LT, P-1, P-LT, M-1, and T-1 welding, as defined by 2.g. These procedures shall include, as a minimum, the information required by Paragraph 4.1.3 of 2.g. Joint numbers shall not be duplicated on ship during the availability.

3.3.2 Class P-3a silver brazing, as defined by 2.f. The procedure shall include, as a minimum, the information required by Sections 4, 5, and 6 of 2.f.

3.3.3 For propellers other than bronze, using 2.g for guidance.

3.3.4 For propulsion shafting and rudder stocks, using 2.m for guidance.

3.4 Do not deposit ferritic welds on welds made with austenitic or non-ferrous electrodes. Where the base material is ferrous and the existing weld is austenitic or non-ferrous, that weld shall be completely removed prior to welding with ferritic electrodes. The welding shall be accomplished in accordance with 2.b.

3.5 Utilize Attachment A to define combatant and non-combatant vessels and applicable table.

3.6 Where requirements in the repair and testing instructions for propulsion boilers conflict, 2.1 shall take precedence.

#### 4. NOTES:

4.1 When this note is referenced and the fabrication document requires record retention, the inspection is to be annotated with an (I).

4.2 The paragraph referencing this note is considered an (I) if the **welding/brazing** is **Class** P-1, P-LT, P-3A, **M-1 or T-1**. If the **welding/brazing** is **Class** P-2, P-3B, **M-2, or T-2**, then the paragraph is considered a (V).

TABLE 1  
WELDING, FABRICATION, AND INSPECTION OF PIPING, PRESSURE VESSELS, PROPELLERS, AND MACHINERY

| L<br>I<br>N<br>E | COLUMN                             | A   | B   | C   | D  |                          | E   |
|------------------|------------------------------------|---|---|---|--|--------------------------|---|
|                  | SITUATION<br>EVOLUTION             | CLASS P-1, P-2 AND<br>P-LT PIPING   | CLASS P-3A AND P-3B<br>PIPING   | HARD FACING<br>VALVE PARTS  | CLASS A<br>PRESSURE VESSEL   | ** PROPULSION<br>BOILERS | *PROPELLERS<br>(BRONZE)   |
| 1                | WELDER AND BRAZER<br>QUALIFICATION | S9074-AQ-GIB-<br>010/248 PARAGRAPH<br>5   | 0900-LP-001-7000<br>SECTION 4   | S9074-AQ-GIB-010/248, PARAGRAPH<br>5  |  | S9221-C1-GTP-<br>010/020 |   |
| 2                | WELDING PROCEDURE                  | S9074-AQ-GIB-<br>010/248 PARAGRAPH<br>4   | NOT APPLICABLE  | S9074-AQ-GIB-010/248, PARAGRAPH<br>4  |  | S9221-C1-GTP-<br>010/020 | DOD-STD-2185<br>PARAGRAPH 4   |
| 3                | BRAZING PROCEDURE                  | NOT APPLICABLE  | 0900-LP-001-7000<br>SECTION 4   | NOT APPLICABLE  |  |                          |   |
| 4                | WELDING<br>REQUIREMENTS            | S9074-AR-GIB-<br>010/278 PARAGRAPH<br>6   | 0900-LP-001-7000<br>SECTION 5   | S9074-AR-GIB-010/278<br>PARAGRAPH 6   |  |                          | MIL-STD-2185<br>PARAGRAPH 5   |
| 5                | FILLER MATERIAL                    | S9074-AR-GIB-<br>010/278 PARAGRAPH<br>5   | 0900-LP-001-7000<br>SECTION 5   | S9074-AR-GIB-010/278, PARAGRAPH<br>5  |  | S9221-C1-GTP-<br>010/020 | DOD-STD-2185<br>PARAGRAPH 5   |
| 6                | JOINT DESIGN                       | S9074-AR-GIB-<br>010/278 PARAGRAPH<br>9 MIL-STD-22  |   | NOT APPLICABLE  | S9074-AR-GIB-<br>010/278 PARAGRAPH 9<br>MIL-STD-22   | S9221-C1-GTP-<br>010/020 |   |
| 7                | HEAT TREATMENT                     | S9074-AR-GIB-<br>010/278 PARAGRAPH<br>6   |   | S9074-AR-GIB-<br>010/278 PARAGRAPHS 6<br>AND 11.6                             | S9074-AR-GIB-<br>010/278 PARAGRAPH 6   | S9221-C1-GTP-<br>010/020 | S9074-AR-GIB-<br>010/278 PARAGRAPH 6<br>DOD-STD-2185<br>PARAGRAPH 5 |
| 8                | WORKMANSHIP<br>REQUIREMENTS        | S9074-AR-GIB-<br>010/278 PARAGRAPH<br>7   | 0900-LP-001-7000<br>SECTION 5   | S9074-AR-GIB-<br>010/278 PARAGRAPHS 7<br>AND 11.6                             | S9074-AR-GIB-<br>010/278 PARAGRAPH 7   | S9221-C1-GTP-<br>010/020 | S9074-AR-GIB-<br>010/278 PARAGRAPH 7                                |
| 9                | VISUAL INSPECT<br>JOINT FIT-UP     | S9074-AR-GIB-<br>010/278 PARAGRAPH<br>9 MIL-STD-22<br>(V) "JOINT FIT-<br>UP"  | 0900-LP-001-7000<br>SECTION 7<br>(V) "JOINT FIT-UP"                                   | NOT APPLICABLE  | S9074-AR-GIB-<br>010/278 PARAGRAPH 9<br>MIL-STD-22<br>(V) "JOINT<br>FIT-UP"                      | S9221-C1-GTP-<br>010/020 | DOD-STD-2185<br>PARAGRAPH 5   |
| 10               | VISUAL INSPECTION                  | S9074-AR-GIB-<br>010/278 PARAGRAPH<br>10<br><br>MIL-STD-2035<br>SECTION 4<br>(V) OR (I) "VISUAL<br>INSPECTION" (SEE<br>4.2) | 0900-LP-001-7000<br>SECTION 7 AND 8<br>(V) OR (I) "VISUAL<br>INSPECTION" (SEE<br>4.2) | S9074-AR-GIB-<br>010/278 PARAGRAPH<br>11.6.3<br><br>MIL-STD-2035<br>SECTION 4 | S9074-AR-GIB-010/278<br>PARAGRAPH 10<br><br>MIL-STD-2035<br>SECTION 4<br>(I) "VISUAL INSPECTION" |                          | MIL-STD-2035<br>SECTION 4   |

\* - PARAGRAPH 3.3.3 APPLIES  
\*\* - PARAGRAPH 3.6 APPLIES

TABLE 1  
WELDING, FABRICATION, AND INSPECTION OF PIPING, PRESSURE VESSELS, PROPELLERS, AND MACHINERY

| L<br>I<br>N<br>E | COLUMN                               | A  | B   | C  | D  |                          | E  |
|------------------|--------------------------------------|--|---|--|--|--------------------------|--|
|                  | SITUATION<br>EVOLUTION               | CLASS P-1, P-2 AND<br>P-LT PIPING  | CLASS P-3A AND P-3B<br>PIPING   | HARD FACING<br>VALVE PARTS   | CLASS A<br>PRESSURE VESSEL   | ** PROPULSION<br>BOILERS | *PROPELLERS<br>(BRONZE)  |
| 11               | RADIOGRAPHIC<br>INSPECTION (RT)      | S9074-AR-GIB-<br>010/278 PARAGRAPH<br>10 T9074-AS-GIB-<br>010/271 PARAGRAPH<br>3<br><br>MIL-STD-2035<br>SECTION 5<br>(NORMALLY ONLY P-1<br>AND P-LT)<br>(I) "RT" | NOT APPLICABLE  |  | S9074-AR-GIB-010/278<br>PARAGRAPH 10<br>T9074-AS-GIB-010/271<br>PARAGRAPH 3<br><br>MIL-STD-2035<br>SECTION 5<br>(I) "RT" |                          | NOT APPLICABLE   |
| 12               | ULTRASONIC<br>INSPECTION (UT)        | NOT APPLICABLE   | 0900-LP-001-7000<br>SECTIONS 6,7,8 AND 9<br>FOR CLASS P-3A<br>(SPECIAL CATEGORY)<br>PIPING ONLY<br>(I) "UT" | NOT APPLICABLE   |  |                          |  |
| 13               | LIQUID PENETRANT<br>INSPECTION (PT)  | S9074-AR-GIB-<br>010/278 PARAGRAPH<br>10 T9074-AS-GIB-<br>010/271 PARAGRAPH<br>5<br><br>MIL-STD-2035<br>SECTION 7<br>(NORMALLY ONLY P-1<br>AND P-LT)<br>(I) "PT" | 0900-LP-001-7000<br>SECTION 7 AND 8<br>(V) OR (I) "PT"<br>(SEE 4.2)   | S9074-AR-GIB-<br>010/278<br>PARAGRAPH<br>11.6.3<br><br>MIL-STD-2035<br>SECTION 7<br>(I) "PT" | S9074-AR-GIB-010/278<br>PARAGRAPH 10<br>T9074-AS-GIB-010/271<br>PARAGRAPH 5<br><br>MIL-STD-2035<br>SECTION 7<br>(I) "PT" |                          | MIL-STD-2035<br>SECTION 7<br>T9074-AS-GIB-<br>010/271<br>PARAGRAPH 5<br>(I) "PT" |
| 14               | MAGNETIC PARTICLE<br>INSPECTION (MT) | S9074-AR-GIB-<br>010/278 PARAGRAPH<br>10 T9074-AS-GIB-<br>010/271 PARAGRAPH<br>4<br><br>MIL-STD-2035<br>SECTION 6<br>(NORMALLY ONLY P-1<br>AND P-LT)<br>(I) "MT" | NOT APPLICABLE  |  | S9074-AR-GIB-010/278<br>PARAGRAPH 10<br>T9074-AS-GIB-010/271<br>PARAGRAPH 4<br><br>MIL-STD-2035<br>SECTION 6<br>(I) "MT" |                          | NOT APPLICABLE   |

\* - PARAGRAPH 3.3.3 APPLIES  
\*\* - PARAGRAPH 3.6 APPLIES

TABLE 1  
WELDING, FABRICATION, AND INSPECTION OF PIPING, PRESSURE VESSELS, PROPELLERS, AND MACHINERY

| L<br>I<br>N<br>E | COLUMN                              | F   | G             | H        | I                    | J  |
|------------------|-------------------------------------|---|---------------|----------|----------------------|--|
|                  | SITUATION<br>EVOLUTION              | MACHINERY CLASS M                                 | TURBINE PARTS | CASTINGS | FORCED DRAFT BLOWERS | REDUCTION AND STEAM<br>TURBINE DRIVEN AUXILIARY<br>GEARS |
| 1                | WELDER AND BRAZER<br>QUALIFICATIONS | S9074-AQ-GIB-010/248, PARAGRAPH 5                 |               |          |                      |  |
| 2                | WELDING PROCEDURE                   | S9074-AQ-GIB-010/248, PARAGRAPH 4                 |               |          |                      |  |
| 3                | BRAZING PROCEDURE                   | NOT APPLICABLE                                    |               |          |                      |  |
| 4                | WELDING<br>REQUIREMENTS             | S9074-AR-GIB-010/278<br>PARAGRAPH 6               |               |          |                      |  |
| 5                | FILLER MATERIAL                     | S9074-AR-GIB-010/278, PARAGRAPH 5                 |               |          |                      |  |
| 6                | JOINT DESIGN                        | S9074-AR-GIB-010/278, PARAGRAPH 9, AND MIL-STD-22 |               |          |                      |  |
| 7                | HEAT TREATMENT                      | S9074-AR-GIB-010/278, PARAGRAPHS 6 AND 8          |               |          |                      |  |
| 8                | WORKMANSHIP<br>REQUIREMENTS         | S9074-AR-GIB-010/278, PARAGRAPH 7                 |               |          |                      |  |

TABLE 1  
WELDING, FABRICATION, AND INSPECTION OF PIPING, PRESSURE VESSELS, PROPELLERS, AND MACHINERY

| LINE | COLUMN                            | F   | G   | H   | I   | J   |
|------|-----------------------------------|---|---|---|---|---|
|      | SITUATION EVOLUTION               | MACHINERY CLASS M   | TURBINE PARTS   | CASTINGS  | FORCED DRAFT BLOWERS  | REDUCTION AND STEAM TURBINE DRIVEN AUXILIARY GEARS  |
| 9    | VISUAL INSPECT JOINT FIT-UP       | S9074-AR-GIB-010/278, PARAGRAPH 10, AND MIL-STD-22 (V) "JOINT FIT-UP"   |   |   |   |   |
| 10   | VISUAL INSPECTION                 | S9074-AR-GIB-010/278 PARAGRAPH 10<br>MIL-STD-2035 SECTION 4 (V) or (I) "VISUAL INSPECTION" (See 4.2)                      | S9074-AR-GIB-010/278 PARAGRAPH 14<br>(V) or (I) "VISUAL INSPECTION" (See 4.2)   | S9074-AR-GIB-010/278 PARAGRAPH 13<br>MIL-STD-2035 SECTION 4                                     | S9074-AR-GIB-010/278 PARAGRAPH 16   | S9074-AR-GIB-010/278 PARAGRAPH 15   |
| 11   | RADIOGRAPHIC INSPECTION (RT)      | S9074-AR-GIB-010/278 PARAGRAPH 10<br>T9074-AS-GIB-010/271 PARAGRAPH 3<br>MIL-STD-2035 SECTION 5 (I) "RT"                  | S9074-AR-GIB-010/278 PARAGRAPH 14<br>T9074-AS-GIB-010/271 PARAGRAPH 3<br>MIL-STD-2035 SECTION 5 (I) "RT"                  | S9074-AR-GIB-010/278 PARAGRAPH 13   | S9074-AR-GIB-010/278 PARAGRAPH 16<br>T9074-AS-GIB-010/271 PARAGRAPH 3<br>MIL-STD-2035 SECTION 5 | NOT APPLICABLE  |
| 12   | ULTRASONIC INSPECTION (UT)        | S9074-AR-GIB-010/278 PARAGRAPH 10<br>T9074-AS-GIB-010/271 PARAGRAPH 6<br>MIL-STD-2035 SECTION 8 (I) "UT"                  | S9074-AR-GIB-010/278 PARAGRAPH 14<br>(I) "UT"   | S9074-AR-GIB-010/278 PARAGRAPH 13   | S9074-AR-GIB-010/278 PARAGRAPH 16   | S9074-AR-GIB-010/278 PARAGRAPH 15   |
| 13   | LIQUID PENETRANT INSPECTION (PT)  | S9074-AR-GIB-010/278 PARAGRAPH 10<br>T9074-AS-GIB-010/271 PARAGRAPH 5<br>MIL-STD-2035 SECTION 7 (V) or (I) "PT" (See 4.2) | S9074-AR-GIB-010/278 PARAGRAPH 14<br>T9074-AS-GIB-010/271 PARAGRAPH 5<br>MIL-STD-2035 SECTION 7 (V) or (I) "PT" (See 4.2) | S9074-AR-GIB-010/278 PARAGRAPH 13<br>T9074-AS-GIB-010/271 PARAGRAPH 5<br>MIL-STD-2035 SECTION 7 | S9074-AR-GIB-010/278 PARAGRAPH 16<br>T9074-AS-GIB-010/271 PARAGRAPH 5<br>MIL-STD-2035 SECTION 7 | S9074-AR-GIB-010/278 PARAGRAPH 15<br>T9074-AS-GIB-010/271 PARAGRAPH 5<br>MIL-STD-2035 SECTION 7 |
| 14   | MAGNETIC PARTICLE INSPECTION (MT) | S9074-AR-GIB-010/278 PARAGRAPH 10<br>T9074-AS-GIB-010/271 PARAGRAPH 4<br>MIL-STD-2035 SECTION 6 (V) or (I) "MT" (See 4.2) | S9074-AR-GIB-010/278 PARAGRAPH 14<br>T9074-AS-GIB-010/271 PARAGRAPH 4<br>MIL-STD-2035 SECTION 6 (V) or (I) "MT" (See 4.2) | S9074-AR-GIB-010/278 PARAGRAPH 13<br>T9074-AS-GIB-010/271 PARAGRAPH 4<br>MIL-STD-2035 SECTION 6 | S9074-AR-GIB-010/278 PARAGRAPH 16<br>T9074-AS-GIB-010/271 PARAGRAPH 4<br>MIL-STD-2035 SECTION 6 | S9074-AR-GIB-010/278 PARAGRAPH 15<br>T9074-AS-GIB-010/271 PARAGRAPH 4<br>MIL-STD-2035 SECTION 6 |

TABLE 2  
WELDING, FABRICATION, AND INSPECTION OF SURFACE SHIP HULLS (COMBATANT)

| L<br>I<br>N<br>E | COLUMN  | A  | B   | C   | D   | E  | F                                  |
|------------------|---|--|---|---|---|--|------------------------------------|
|                  | MATERIAL<br>EVOLUTION   | CARBON STEEL (MS)<br>AND (HTS)   | *HIGH STRENGTH STEEL<br>(HY-80/100, HSLA-80 AND<br>STS)                   | ALUMINUM ALLOY                            | CHROMIUM NICKEL<br>STEEL<br>(STAINLESS)               | COPPER AND/OR<br>NICKEL BASE<br>ALLOYS               | SILICONE BRONZE<br>ALUMINUM BRONZE |
| 1                | WELDER<br>QUALIFICATION   | S9074-AQ-GIB-010/248, PARAGRAPH 5  |   |   |   |  |                                    |
| 2                | WELDING<br>PROCEDURE  | S9074-AQ-GIB-010/248, PARAGRAPH 4  |   |   |   |  |                                    |
| 3                | ELECTRODE   | MIL-STD-1689<br>PARAGRAPH 10<br>TABLE X  | MIL-STD-1689 PARAGRAPH<br>10<br>TABLE XI                                  | MIL-STD-1689<br>PARAGRAPH 10<br>TABLE XVI | MI-STD-1689<br>PARAGRAPH 10<br>TABLES XII AND<br>XIII | MIL-STD-1689<br>PARAGRAPH 10<br>TABLES XIV AND<br>XV | S9074-AR-GIB-<br>010/278 TABLE II  |
| 4                | JOINT DESIGN  | MIL-STD-22<br>MIL-STD-1689, PARAGRAPH 11   |   |   |   |  |                                    |
| 5                | WELDING<br>REQUIREMENTS   | MIL-STD-1689, PARAGRAPH 13   |   |   |   |  |                                    |
| 6                | WORKMAN-SHIP<br>REQUIREMENTS  | MIL-STD-1689, PARAGRAPHS 12 AND 14   |   |   |   |  |                                    |
| 7                | VISUAL<br>(I) If<br>applicable;<br>see 4.1.                                     | MIL-STD-1689, PARAGRAPHS 6, 7, AND 8<br>T9074-AS-GIB-010/271, PARAGRAPH 8                            |   |   |   |  |                                    |
| 8                | RADIO-GRAPHIC<br>INSPECTION<br>(RT)<br>(I) If<br>applicable;<br>see 4.1.        | MIL-STD-1689, PARAGRAPHS 6, 7, AND 8<br>MIL-STD-2035, SECTION 5<br>T9074-AS-GIB-010/271, PARAGRAPH 3 |   |   |   |  |                                    |
| 9                | ULTRASONIC<br>INSPECTION<br>(UT)<br>(I) If<br>applicable;<br>see 4.1.           | MIL-STD-2035, SECTION 8<br>MIL-STD-1689, PARAGRAPHS 6, 7, AND 8<br>T9074-AS-GIB-010/271, PARAGRAPH 6 |   |   |   |  |                                    |
| 10               | LIQUID<br>PENETRANT<br>INSPECTION<br>(PT)<br>(I) If<br>applicable;<br>see 4.1.  | T9074-AS-GIB-<br>010/271 PARAGRAPH<br>5  | MIL-STD-1689, PARAGRAPHS 6, 7, AND 8<br>T9074-AS-GIB-010/271, PARAGRAPH 5 |   |   |  |                                    |
| 11               | MAGNETIC<br>PARTICLE<br>INSPECTION<br>(MT)<br>(I) If<br>applicable;<br>see 4.1. | MIL-STD-1689, PARAGRAPH 6<br>T9074-AS-GIB-010/271, PARAGRAPH 4                                       |   | NOT APPLICABLE                            |   |  |                                    |

\* - PARAGRAPH 3.4 APPLIES

TABLE 3  
WELDING, FABRICATION, AND INSPECTION OF SURFACE SHIP HULLS (NON-COMBATANT) \* \*\*

| L<br>I<br>N<br>E | COLUMN                            | A                                    | B                                      | C              | D                                 | E                                | F                               |
|------------------|-----------------------------------|--------------------------------------|--|----------------|-----------------------------------|----------------------------------|---------------------------------|
|                  | MATERIAL EVOLUTION                | CARBON STEEL (MS)                    | ***<br>HIGH STRENGTH STEEL (HY-80/100) | ALUMINUM ALLOY | CHROMIUM NICKEL STEEL (STAINLESS) | COPPER AND/OR NICKEL BASE ALLOYS | SILICONE BRONZE ALUMINUM BRONZE |
| 1                | WELDER QUALIFICATION              | ABS RULES, PART 2, SECTION 3, PART A |  |                |                                   |                                  |                                 |
| 2                | WELDING PROCEDURE                 | ABS RULES, PART 2, SECTION 3, PART A |  |                |                                   |                                  |                                 |
| 3                | ELECTRODE                         | ABS RULES, PART 2, SECTION 3, PART A |  |                |                                   |                                  |                                 |
| 4                | JOINT DESIGN                      | ABS RULES, PART 2, SECTION 3, PART A |  |                |                                   |                                  |                                 |
| 5                | WELDING REQUIREMENTS              | ABS RULES, PART 2, SECTION 3, PART A |  |                |                                   |                                  |                                 |
| 6                | WORKMANSHIP REQUIREMENTS          | ABS RULES, PART 2, SECTION 3, PART A |  |                |                                   |                                  |                                 |
| 7                | VISUAL                            | ABS RULES, PART 2, SECTION 3, PART A |  |                |                                   |                                  |                                 |
| 8                | RADIOGRAPHIC INSPECTION (RT)      | ABS RULES, PART 2, SECTION 3, PART A |  |                |                                   |                                  |                                 |
| 9                | ULTRASONIC INSPECTION (UT)        | ABS RULES, PART 2, SECTION 3, PART A |  |                |                                   |                                  |                                 |
| 10               | LIQUID PENETRANT INSPECTION (PT)  | ABS RULES, PART 2, SECTION 3, PART A |  |                |                                   |                                  |                                 |
| 11               | MAGNETIC PARTICLE INSPECTION (MT) | ABS RULES, PART 2, SECTION 3, PART A |  | NOT APPLICABLE |                                   |                                  |                                 |

\* - IDENTIFICATION OF "SURVEYOR" IN ABS RULES SIGNIFIES SUPERVISOR OF SHIPBUILDING (SUPERVISOR) ACTION. THE SUPERVISOR MAY USE MIL-STD-1689 FOR GUIDANCE WHERE ADDITIONAL DIRECTION IS NECESSARY. SUCH GUIDANCE MAY BE USED TO: ESTABLISH NDT REQUIREMENTS, ESTABLISH WELDING/NDT PROCEDURE AND PERSONNEL QUALIFICATION REQUIREMENTS, OR TO DEFINE OTHER ATTRIBUTES LISTED IN THE "MATERIAL EVOLUTION" LINE OF TABLE 3.

\*\* - THE SUPERVISOR MAY ALSO ALLOW THE SHIPBUILDER TO CHOOSE FROM THE FOLLOWING OPTIONS, PROVIDING:

- THE SHIPBUILDER'S UTILIZATION OF THE FOLLOWING OPTIONS SHALL RESULT IN NO ADDITIONAL COST TO THE GOVERNMENT.
- THE SHIPBUILDER SHALL UTILIZE THE FABRICATION DOCUMENT SELECTED FOR THE ENTIRE AVAILABILITY AND SHALL NOT SWITCH BACK AND FORTH BETWEEN DOCUMENTS.
- THE SHIPBUILDER SHALL NOTIFY THE SUPERVISOR OF WHICH FABRICATION DOCUMENT HAS BEEN SELECTED.

OPTIONS:

- A) MIL-STD-1689 MAY BE UTILIZED BY THE SHIPBUILDER AT THE SHIPBUILDER'S DISCRETION. THE REQUIREMENTS OF TABLE 2 ABOVE WOULD THEN APPLY.
- B) FOR DETERMINATION OF NDT METHOD(S) AND EXTENT OF NDT INSPECTION WHEN REPAIRS ARE TO BE ACCOMPLISHED, THE SHIPBUILDER MAY REQUEST TO UTILIZE THE SAME NDT REQUIREMENTS WHICH WERE INVOKED IN CONSTRUCTION OF THE VESSEL. IN SUCH CASES, THE SHIPBUILDER SHALL BE RESPONSIBLE TO DETERMINE THE ORIGINAL NDT REQUIREMENTS AND SUBMIT EVIDENCE SUCH AS DRAWINGS OR SPECIFICATIONS WHICH DETAIL THE REQUIREMENTS TO THE SUPERVISOR ALONG WITH A REQUEST FOR APPROVAL.
- C) THE SHIPBUILDER MAY REQUEST TO UTILIZE PRE-ESTABLISHED WELDING AND/OR NDT PROCEDURES AND PERSONNEL QUALIFICATION PROGRAM(S) WHICH HAVE BEEN PREVIOUSLY UTILIZED IN THE PERFORMANCE OF SIMILAR ABS-ACCEPTED WORK. IN SUCH CASES, THE SHIPBUILDER SHALL SUBMIT EVIDENCE OF SUCH ABS ACCEPTABILITY TO THE SUPERVISOR ALONG WITH DESCRIPTIVE DETAILS AND SUPPORTING DOCUMENTATION FOR THE PROPOSED PROGRAM(S). SUCH DOCUMENTATION SHALL INCLUDE THE WELDING/NDT PROCEDURES AND METHODS OF WELDING/NDT PERSONNEL QUALIFICATION WHICH WERE UTILIZED IN FORMER ABS-ACCEPTED WORK. THE SHIPBUILDER SHALL ALSO SUBMIT OTHER SUPPORTING EVIDENCE WHICH MAY BE REQUESTED BY THE SUPERVISOR TO ESTABLISH THAT THE PROPOSED PROGRAMS HAVE BEEN PREVIOUSLY UTILIZED FOR SIMILAR ABS-ACCEPTED WORK.

\*\*\* - PARAGRAPH 3.4 APPLIES.



TABLE 4  
WELDING, FABRICATION, AND INSPECTION OF METAL BOAT AND CRAFT HULLS

| L<br>I<br>N<br>E | COLUMN                                     | A   | B  | C   | D   | E   | F  |
|------------------|--|---|--|---|---|---|--|
|                  | MATERIAL<br>EVOLUTION                      | CARBON STEEL (MS)   | *HIGH STRENGTH STEEL<br>(HY-80/100)              | ALUMINUM ALLOY                            | CHROMIUM NICKEL<br>STEEL<br>(STAINLESS)   | COPPER AND/OR<br>NICKEL BASE<br>ALLOYS                  | SILICONE<br>BRONZE<br>ALUMINUM<br>BRONZE |
| 1                | WELDER<br>QUALIFICATION                    | S9074-AQ-GIB-010/248, PARAGRAPH 5   |  |   |   |   |  |
| 2                | WELDING<br>PROCEDURE                       | S9074-AQ-GIB-010/248, PARAGRAPH 4   |  |   |   |   |  |
| 3                | ELECTRODE                                  | 0900-060-4010<br>SECTION 10 TABLE<br>10-1   | 0900-060-4010 SECTION 10<br>TABLES 10-2 AND 10-3 | 0900-060-4010<br>SECTION 10 TABLE<br>10-7 | 0900-060-4010<br>SECTION 10<br>TABLE 10-4 | 0900-060-4010<br>SECTION 10,<br>TABLES 10-5 AND<br>10-6 | S9074-AR-GIB-<br>010/278 TABLE<br>II     |
| 4                | JOINT DESIGN                               | MIL-STD-22<br>0900-060-4010, SECTION 11   |  |   |   |   |  |
| 5                | WELDING<br>REQUIREMENTS                    | 0900-060-4010, SECTION 13   |  |   |   |   |  |
| 6                | WORKMANSHIP<br>REQUIREMENTS                | 0900-060-4010, SECTION 14   |  |   |   |   |  |
| 7                | VISUAL                                     | 0900-060-4010, SECTIONS 6, 7, AND 8<br>T9074-AS-GIB-010/271, PARAGRAPH 8                      |  |   |   |   |  |
| 8                | RADIOGRAPHIC<br>INSPECTION<br>(RT)         | 0900-060-4010, SECTION 6, TABLE 6-1 AND SECTIONS 7 AND 8<br>T9074-AS-GIB-010/271, PARAGRAPH 3 |  |   |   |   |  |
| 9                | ULTRASONIC<br>INSPECTION<br>(UT)           | T9074-AS-GIB-010/271, PARAGRAPH 6   |  |   |   |   |  |
| 10               | LIQUID<br>PENETRANT<br>INSPECTION<br>(PT)  | 0900-060-4010, SECTIONS 6, 7, AND 8<br>T9074-AS-GIB-010/271, PARAGRAPH 5                      |  |   |   |   |  |
| 11               | MAGNETIC<br>PARTICLE<br>INSPECTION<br>(MT) | 0900-060-4010<br>SECTION 6<br>T9074-AS-GIB-010/271<br>PARAGRAPH 4                             |  | NOT APPLICABLE                            |   |   |  |

\* - PARAGRAPH 3.4 APPLIES

ATTACHMENT A  
COMBATANT SURFACE SHIPS

WARSHIPS

TABLE

Aircraft Carriers:

|   |          |   |
|---|----------|---|
| Aircraft Carrier .....                      | CV.....  | 2 |
| Aircraft Carrier (nuclear propulsion) ..... | CVN..... | 2 |
| ASW Aircraft Carrier .....                  | CVS..... | 2 |

Surface Combatants:

|  |          |   |
|--|----------|---|
| Battleship .....                               | BB.....  | 2 |
| Guided Missile Cruiser .....                   | CG.....  | 2 |
| Guided Missile Cruiser (nuclear powered) ..... | CGN..... | 2 |
| Destroyer .....                                | DD.....  | 2 |
| Guided Missile Destroyer .....                 | DDG..... | 2 |
| Frigate .....                                  | FF.....  | 2 |
| Guided Missile Frigate .....                   | FFG..... | 2 |
| Frigate (Naval Reserve Training) .....         | FFT..... | 2 |

Patrol Combatants:

|  |          |   |
|--|----------|---|
| Patrol Combatant Missile (hydrofoil) ..... | PHM..... | 2 |
| Patrol Coastal .....                       | PC.....  | 2 |

AMPHIBIOUS WARFARE SHIPS

|   |          |   |
|---|----------|---|
| Amphibious Command Ship .....                   | LCC..... | 2 |
| Amphibious Assault Ship (general purpose) ..... | LHA..... | 2 |
| Amphibious Cargo Ship .....                     | LKA..... | 2 |
| Amphibious Transport Dock .....                 | LPD..... | 2 |
| Amphibious Assault Ship (helicopter) .....      | LPH..... | 2 |
| Dock Landing Ship .....                         | LSD..... | 2 |
| Amphibious Assault Ship (general purpose) ..... | LHD..... | 2 |
| Tank Landing Ship .....                         | LST..... | 2 |

AUXILIARY SHIPS

|                                |          |   |
|--------------------------------|----------|---|
| Ammunition Ship .....          | AE.....  | 2 |
| Combat Store Ship .....        | AFS..... | 2 |
| Oiler .....                    | AO.....  | 2 |
| Fast Combat Support Ship ..... | AOE..... | 2 |
| Replenishment Oiler .....      | AOR..... | 2 |
| Store Ship .....               | AF.....  | 2 |

ATTACHMENT A  
(Con't)

MINE WARFARE SHIPS

TABLE

|   |          |   |
|---|----------|---|
| Mine Countermeasures Support Ship ..... | MCS..... | 2 |
| Mine Countermeasures Ship .....         | MCM..... | 2 |
| Costal Minehunter .....                 | MHC..... | 2 |

COMBATANT SURFACE CRAFT

AMPHIBIOUS WARFARE CRAFT

|   |           |   |
|---|-----------|---|
| Landing Craft, Air Cushion .....        | LCAC..... | 4 |
| Landing Craft, Mechanized .....         | LCM.....  | 4 |
| Landing Craft, Personnel, Large .....   | LCPL..... | 4 |
| Landing Craft, Utility .....            | LCU.....  | 2 |
| Landing Craft, Vehicle, Personnel ..... | LCVP..... | 4 |
| Light Seal Support Craft .....          | LSSC..... | 4 |
| Amphibious Warping Tug .....            | LWT.....  | 4 |
| Medium Seal Support Craft .....         | MSSC..... | 4 |
| Swimmer Delivery Vehicle .....          | SDV.....  | 4 |
| Side Loading Warping Tug .....          | SLWT..... | 4 |
| Special Warfare Craft, Light .....      | SWCL..... | 4 |
| Special Warfare Craft, Medium .....     | SWCM..... | 4 |

PATROL CRAFT

|                                  |          |   |
|----------------------------------|----------|---|
| Mini-Armored Troop Carrier ..... | ATC..... | 4 |
| Patrol Boat .....                | PB.....  | 4 |
| River Patrol Boat .....          | PBR..... | 4 |
| Patrol Craft (fast) .....        | PCF..... | 4 |
| Fast Patrol Craft .....          | PTF..... | 4 |

ATTACHMENT A  
(Con't)

NON-COMBATANT SURFACE SHIPS

AUXILIARY SHIPS

TABLE

|   |           |   |
|---|-----------|---|
| Auxiliary Crane Ship .....                    | ACS       | 3 |
| Destroyer Tender .....                        | AD.....   | 3 |
| Miscellaneous .....                           | AG.....   | 3 |
| Deep Submergence Support Ship .....           | AGDS..... | 3 |
| Miscellaneous Command Ship .....              | AGF.....  | 3 |
| Auxiliary General Frigate .....               | AGFF..... | 3 |
| Missile Range Instrumentation Ship .....      | AGM.....  | 3 |
| Oceanographic Research Ship .....             | AGOR..... | 3 |
| Ocean Surveillance Ship .....                 | AGOS..... | 3 |
| Surveying Ship .....                          | AGS.....  | 3 |
| Auxiliary Research Submarine .....            | AGSS..... | 3 |
| Hospital Ship .....                           | AH.....   | 3 |
| Cargo Ship .....                              | AK.....   | 3 |
| Auxiliary Cargo Barge/Lighter Ship .....      | AKB.....  | 3 |
| Auxiliary Cargo Float-On/Float-Off Ship ..... | AKF.....  | 3 |
| Gasoline Tanker .....                         | AOG.....  | 3 |
| Transport Oiler .....                         | AOT.....  | 3 |
| Transport .....                               | AP.....   | 3 |
| Barracks Craft .....                          | APL.....  | 3 |
| Repair Ship .....                             | AR.....   | 3 |
| Cable Repairing Ship .....                    | ARC.....  | 3 |
| Salvage Ship .....                            | ARS.....  | 3 |
| Submarine Tender .....                        | AS.....   | 3 |
| Submarine Rescue Ship .....                   | ASR.....  | 3 |
| Fleet Ocean Tug .....                         | ATF.....  | 3 |
| Salvage and Rescue Ship .....                 | ATS.....  | 3 |
| Aviation Logistic Support Ship .....          | AVB.....  | 3 |

NON-COMBATANT SURFACE CRAFT

SERVICE CRAFT

|  |         |   |
|--|---------|---|
| Large Auxiliary Floating Dry Dock (non-self-propelled) ... | AFDB... | 3 |
| Small Auxiliary Floating Dry Dock (non-self-propelled) ... | AFDL... | 3 |
| Medium Auxiliary Floating Dry Dock (non-self-propelled) .. | AFDM... | 3 |
| Auxiliary Repair Dry Dock (non-self-propelled) .....       | ARD...  | 3 |
| Medium Auxiliary Repair Dry Dock (non-self-propelled) .... | ARDM... | 3 |
| Causeway Section, Powered .....                            | CSP...  | 3 |
| Causeway Section (non-self-propelled) .....                | CSNP... | 3 |
| Unclassified Miscellaneous .....                           | IX...   | 3 |
| Miscellaneous Auxiliary (self-propelled) .....             | YAG...  | 3 |

ATTACHMENT A  
(Con't)

|  |         |   |
|--|---------|---|
| Open Lighter (non-self-propelled) .....                    | YC...   | 3 |
| Car Float (non-self-propelled) .....                       | YCF...  | 3 |
| Aircraft Transportation Lighter (non-self-propelled) ..... | YCV...  | 3 |
| Cargo Semi-Submersible Barge .....                         | YCSS... | 3 |
| Floating Crane (non-self-propelled) .....                  | YD...   | 3 |
| Diving Tender (non-self-propelled) .....                   | YDT...  | 3 |
| Covered Lighter (self-propelled) .....                     | YF...   | 3 |
| Ferryboat or Launch (self-propelled) .....                 | YFB...  | 3 |
| Yard Floating Dry Dock (non-self-propelled) .....          | YFD...  | 3 |
| Covered Lighter (non-self-propelled) .....                 | YFN...  | 3 |
| Large Covered Lighter (non-self-propelled) .....           | YFNB... | 3 |
| Dry Dock Companion Craft (non-self-propelled) .....        | YFND... | 3 |
| Lighter (special purpose) (non-self-propelled) .....       | YFNX... | 3 |
| Floating Power Barge (non-self-propelled) .....            | YFP...  | 3 |
| Refrigerated Covered Lighter (self-propelled) .....        | YFR...  | 3 |
| Refrigerated Covered Lighter (non-self-propelled) .....    | YFRN... | 3 |
| Covered Lighter (range tender) (self-propelled) .....      | YFRT... | 3 |
| Harbor Utility Craft (self-propelled) .....                | YFU...  | 3 |
| Garbage Lighter (self-propelled) .....                     | YG...   | 3 |
| Garbage Lighter (non-self-propelled) .....                 | YGN...  | 3 |
| Salvage Lift Craft, Heavy (non-self-propelled) .....       | YHLC... | 3 |
| Salvage Lift Craft, Light .....                            | YLC...  | 3 |
| Dredge (self-propelled) .....                              | YM...   | 3 |
| Gate Craft (non-self-propelled) .....                      | YNG...  | 3 |
| Fuel Oil Barge (self-propelled) .....                      | YO...   | 3 |
| Gasoline Barge (self-propelled) .....                      | YOG...  | 3 |
| Gasoline Barge (non-self-propelled) .....                  | YOGN... | 3 |
| Fuel Oil Barge (non-self-propelled) .....                  | YON...  | 3 |
| Oil Storage Barge (non-self-propelled) .....               | YOS...  | 3 |
| Patrol Craft (self-propelled) .....                        | YP...   | 4 |
| Floating Pile Driver (non-self-propelled) .....            | YPD...  | 3 |

SERVICE CRAFT

|   |        |   |
|---|--------|---|
| Floating Workshop (non-self-propelled) .....                | YR...  | 3 |
| Repair and Berthing Barge (non-self-propelled) .....        | YRB... | 3 |
| Repair, Berthing and Messing Barge (non-self-propelled) ... | YRBM.. | 3 |
| Floating Dry Dock Workshop (hull) (non-self-propelled) .... | YRDH.. | 3 |
| Floating Dry Dock Workshop (machine) (non-self-propelled) . | YRDM.. | 3 |
| Radiological Repair Barge (non-self-propelled) .....        | YRR... | 3 |
| Salvage Craft Tender (non-self-propelled) .....             | YRST.. | 3 |
| Seaplane Wrecking Derrick (self-propelled) .....            | YSD... | 3 |
| Sludge Removal Barge (non-self-propelled) .....             | YSR... | 3 |
| Large Harbor Tug .....                                      | YTB... | 3 |
| Small Harbor Tug .....                                      | YTL... | 4 |
| Medium Harbor Tug .....                                     | YTM... | 4 |

ATTACHMENT A  
(Con't)

|  |       |   |
|--|-------|---|
| Torpedo Trials Craft .....             | YTT.. | 4 |
| Water Barge (self-propelled) .....     | YW..  | 3 |
| Water Barge (non-self-propelled) ..... | YWN.. | 3 |

NOTES:

Letter prefixes to classification symbols may add identification:

- E -- Prototype ship or craft that is in an experimental  
or developmental status.
- T -- Assigned to MSC (Military Sealift Command)
- F -- Being Constructed for a foreign government.
- X -- Often added to existing classifications to indicate  
a new class whose characteristics has not been defined.